

years of operation. However, after the plant closed in the early 1990s, workers began to report illnesses to a local health agency. Of the first 12 workers seen at one clinic, four were diagnosed with asbestosis, a scarring of the lungs caused by inhalation of asbestos fibers, seven others had pleural plaques (calcification of the thin membranes that line the chest cavity), and one died four months later with peritoneal cancer. Some scientists say all of these illnesses are attributable to asbestos exposure. Though the authors report that efforts to locate more workers were hindered by Eternit, 421 former Osasco workers were eventually examined. In an unpublished follow-up to the *IJOEH* paper, Giannasi reports that 57.5% of these people had diseases that could be related to inhalation of asbestos dust, including asbestosis, asthma, peritoneal plaques, lung cancer, and reduced respiratory capacity.

This high incidence of morbidity, the authors conclude, is evidence that asbestos fibers simply cannot be used safely. "The world's experience with the industrial use of asbestos leads to the conclusion that the only way to ensure an end to asbestos-related disease is to ban [asbestos]," Giannasi and Thébaud-Mony write. "This approach, which has been taken in Sweden and other developed countries, is even more necessary in developing countries, where stringent regulation and enforcement are not a viable alternative to the ban."

However, industry-supported groups such as Canada's Asbestos Institute claim that calls for an outright ban on asbestos are overzealous because only certain varieties of the fiber present a real danger and these varieties are rarely used now. "Ninety percent of the asbestos used in the world right now is chrysotile," says Scott Houston, director general of the Asbestos Institute. "Chrysotile asbestos does not present a public health risk, and as for occupational exposures, if the levels of exposure during manufacture are controlled using very basic industrial ventilation technology—and these technologies are available in every country—there is really no excess risk there either." The Montréal-based institute is supported by a consortium of asbestos companies and the governments of Canada and Québec; Canada is the world's second leading producer of chrysotile asbestos after Russia.

Asbestos industry representatives say that reports of rampant health problems in

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Painting a Clearer Picture of Deforestation

One of the reasons often cited by world leaders for refusing to take direct actions to curb global warming is that we know too little about the problem. For instance, they argue, we don't know how fast the planet is warming, what the effects of the warming will be, or even exactly where all the excess atmospheric carbon dioxide is coming from. Leaders often say that in the face of such uncertainty, it would be imprudent to burden people with new laws and regulations. These issues are expected to be the topic of heated debate at the International Climate Summit to be held in Kyoto, Japan, in December. One key issue to be addressed at that meeting is the importance of protecting the earth's rain forests as a means of stopping global warming. Rain forests are particularly dense in biomass—and, therefore, carbon—and the routine burning of these forests in many countries releases carbon dioxide and destroys an important terrestrial carbon sink. However, the role of rain forest destruction has remained largely unknown in the global warming equation because tracking and quantifying the destruction has been a nearly impossible task.

Now, however, a joint project of NASA, the University of Maryland, and the University of New Hampshire is, quite literally, painting a clearer picture of rain forest destruction. Researchers with the Landsat Pathfinder's Humid Tropical Forest Inventory Project are using satellite images of the earth to construct maps that accurately portray land use and vegetation density across the great rain forests of the Amazon, Southeast Asia, and Africa for several recent time periods. The data gathered by this effort will function like a CAT scan of the earth, allowing scientists to pinpoint where the destruction of rain forests is occurring the fastest so that remediation efforts can be concentrated on these areas.

A site on the World Wide Web has been constructed by the Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire to share the information gathered by the project. The satellite data are compiled by the institute, analyzed, and edited before being plotted on a map of the rain forest. Though the group can discern land use in areas smaller than a square kilometer from the satellite images, the data are aggregated into 16-km squares for distribution over the Internet. Maps of deforestation, regrowth, and forest density for entire rain forests are compiled by color coding and plotting these squares, and the maps can be viewed on the project's Internet site by following the Data Products and Results link from the home page, which is located at <http://pathfinder-www.sr.unh.edu/pathfinder1/>.

Original satellite images of the areas being studied can also be viewed on the site by following the Satellite Image Browser link on the home page. Through this link, users can find the satellite pictures of the area they want to view either by using interactive maps or by selecting the area from lists of cities and geographical features. To better illustrate how the rain forests have changed in the past few decades, the site also provides several maps that are animated to show the transformation of the land. These maps, which can be found through the Morphs link, available through the Multimedia link on the home page, vividly show how logging roads, dams, and expanding populations can devastate huge sections of forest in a short amount of time. Also under the Multimedia link is a collection of media kits that provide a succinct introduction to the project.

The General Information link on the home page leads to more detailed accounts of the project. Explanations of how data are gathered, processed, analyzed, and checked are available via the Project Overview link. The full texts of some of the scientific papers that have been generated by the project are available under the Published Papers link, while news articles that utilized Landsat data and project reports can be accessed by the Reports, Miscellaneous link.

These papers and reports, as well as the ongoing research, will make it easier to eliminate some of the unknowns from the global warming equation. And the Landsat Pathfinder World Wide Web site will allow new findings to be quickly disseminated to scientists, leaders, and policy makers around the world—even in Kyoto.

Landsat Pathfinder

National Aeronautics and Space Administration
Humid Tropical Forest Inventory Project

